MULTIMEDIA UNIVERSITY

STUDENT ID NO

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2017/2018

PMT0204 – FUNDAMENTAL MATHEMATICS II

(All sections / Groups)

3 March 2018
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of TWO (2) printed pages with 4 questions only.
2. Answer all FOUR (4) questions.
3. Write all your answers in the answer booklet provided.
4. Only NON-PROGRAMMABLE calculators are allowed.

Question 1 (25 Marks)

a) Given the following matrices:

$$A = \begin{bmatrix} 2 & 1 & 2 \\ 1 & 4 & 0 \end{bmatrix} \quad B = \begin{bmatrix} -3 & 2 & 0 \\ 2 & 1 & 3 \end{bmatrix} \quad C = \begin{bmatrix} 4 & 2 \\ 1 & 5 \\ 1 & 2 \end{bmatrix}, \text{ find:}$$

i) 2A + 3B (3 marks)

ii) BC (3 marks)

iii) AC + BC (3 marks)

b) Find the determinant of each square matrix:

i. $\begin{bmatrix} 6 & 5 \\ 2 & 2 \end{bmatrix}$ (2 marks)

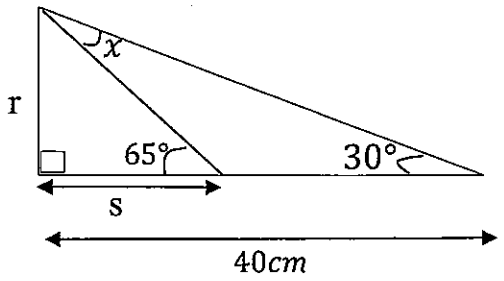
ii. $\begin{bmatrix} 1 & 1 & 1 \\ 3 & 2 & -1 \\ 3 & 1 & 2 \end{bmatrix}$ (3 marks)

c) Solve the following system of equation using the inverse method.

$$\begin{aligned} x + 2y - z &= -3 \\ 2x - 4y + z &= -7 \\ -2x + 2y - 3z &= 4 \end{aligned}$$ (11 marks)

Question 2 (25 Marks)

a) In the triangle shown below, find the value of r, s and x. Give each answer correct to the nearest whole number. (6 marks)



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b) Determine the amplitude, period and phase shift of $y = 2\cos\left(3x + \frac{\pi}{2}\right)$. Then, graph the function. (8 marks)

c) Solve the trigonometric function $\sin x + \sqrt{2} = -\sin x$ (5 marks)

d) Find the polar form and represent graphically the complex number 7−5j. (6 marks)

Question 3 (25 Marks)

a) Evaluate the following limits:

i. $\lim_{x\to 3} \frac{x^2-9}{x-3}$ (3 marks)

ii. $\lim_{x\to 4} \frac{\sqrt{x}-2}{x-4}$ (4 marks)

iii. $\lim_{x\to \infty} \frac{2x^4-x^2+8x}{-5x^4+7}$ (4 marks)

b) Find the derivative of the following functions:

i. $y = \sin(3x^2 + x)$ (3 marks)

ii. $x^3y^5 + 3x = 8y^3 + 1$ (5 marks)

c) Given $f(x) = x^4 - 8x^2$, determine the intervals where f is increasing and decreasing. (6 marks)

Question 4 (25 Marks)

a) Integrate the following functions:

i. $\int_1^3 \left(x - \frac{1}{x}\right) dx$ (3 marks)

ii. $y = \int x^3 \sin(x^4)\, dx$ (5 marks)

iii. $y = \int e^x \cos x\, dx$ (9 marks)

b) Find the area bounded by the curves $y = x^2 + 5x$ nd $y = 3 - x^2$. (8 marks)

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